SHORT COMMUNICATIONS

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INTERSPECIFIC AND INTRASPECIFIC AGGRESSION AMONG GRIFFON AND CINEREOUS VULTURES AT NESTING AND FORAGING SITES

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Food partitioning within vulture guilds reduces the intensity of competition even when several species share the same carcass (König 1983, Hiraldo 1977, Mundy 1982). Apparently, aggressive encounters are minimized by the relative sizes and ages of individuals in these feeding groups (Alvárez et al. 1976, Grubh 1978, Anderson and Horwitz 1979, Mundy 1982, Blanco and Martínez 1996). Interspecific and intraspecific aggression is frequent when large numbers gather at large carcasses (Mundy 1982). Most interactions involve dominance displays that either do not result in direct contact or, at most, result in slight disputes reduced to minor pecking and kicking. Overall, severe aggression seems to be avoided.

In addition to carcasses, vultures can at times also show intra- and interspecific competitive behaviors at their nest sites. Here too, competition may be passive and regulated by the abundance, spacing and timing of breeding of the different species, or it may result in active aggression and displacement among individuals of the same species (Donázar et al. 1989, Fernández and Donázar 1991).

Griffon Vultures (*Gyps fulvus*) and Cinereous Vultures (*Aegypius monachus*) share feeding and nesting situations across wide areas of the Iberian peninsula, but little is known of the frequency, intensity and context of agonistic interactions that result from competition between them (König 1974, Alvárez et al. 1976, Fernández and Donázar 1991, Hiraldo et al. 1991). In this note we report two cases of intense aggression between Griffon and Cinereous Vultures.

The first case occurred while we observed Cinereous and Griffon Vultures feeding on a cattle carcass near the Natural Park of Monfragüe, Cáceres Province (western Spain) in November 1992. A maximum of 94 Griffon Vultures and 48 Cinereous Vultures were observed gathered to feed on the carcass. Most of them were feeding on the back of the cow, but two subadult Cinereous Vultures were feeding on the head by putting their heads inside the mouth of the cow. A first-year Griffon Vulture approached and began to feed together with the two Cinereous Vultures. When the Griffon Vulture had its head inside the mouth of the cow, an adult Cinereous Vulture approached and attacked the Griffon Vulture by grasping its neck with its bill for >30 sec. When the Cinereous Vulture released the Griffon Vulture, it left a deep wound that bled profusely. Immediately the injured vulture abandoned the carcass, leaving a clear blood trail and disappeared into the adjacent vegetation. The wound appeared serious enough that it might have been lethal.

The second case involved of a conflict between two adult (probably female) Griffon Vultures at a nesting site traditionally used in the gorges of the Riaza River, Segovia Province (central Spain) in November 1995. We had observed an adult pair at this nest two months previously showing pair-bonding behavior and even copulating. The mates were sexed when copulation occurred and subsequently were easily recognized by individual plumage features. The third bird was probably a female, based on the size and shape of the bill and head. The aggressive en-

counter began when the two presumed female Griffon Vultures began to make rasping calls and to fight at the nest site. During the fight, one of the vultures laid on its back with its wings extended and defended itself with its legs and bill from pecking attacks by the other vulture. The two vultures continued to fight, alternating positions and pecking at each other's head and neck for >20 min. At the end of the fight, both females remained motionless on their backs and face to face with their wings extended for about 5 min. Finally, after another 6 min of violent aggression, one of the vultures displaced the other from the nest site. As a result of the fight, both vultures sustained numerous bleeding wounds on their heads and necks, especially around their eyes, mandibles, and throats.

Initially, the male watched the conflict from the edge of the nest site and only pecked a few times at the tips of the primaries of the fighting females. The male later flew to a nearby rock from which he observed the fight for the remainder of its duration.

During many years of research, we have observed several hundred vulture gatherings at carcasses where numerous agonistic interactions have occurred. Most aggressive behaviors have been between individuals of the same species and especially between the more social and abundant Griffon Vulture (Hiraldo et al. 1979). These encounters never generated wounds and usually resulted in the loss of a few neck or rarely primary feathers. The more violent encounters have involved first-year birds assaulted by older individuals indicating that immature vultures may not have yet established dominance relationships or developed appropriate social behavior. Our first observation indicates that Cinereous Vultures are capable of occasionally injuring Griffon Vultures seriously enough to result in death. Undoubtedly, their larger body size and stronger bill enables them to dominate in aggressive encounters (König 1983). Nevertheless, this behavior is exceptional and probably occurs only when large numbers of vultures, especially Cinereous Vultures, gather at a carcass.

Competition for nest sites may be a cause of aggression between conspecifics under conditions of high population density (Martínez and Cobo 1993). The availability of nest sites for Griffon Vultures has not been documented to be a factor limiting the population size in northern Spain where high densities are reached (Arroyo et al. 1990, Donázar and Fernández 1990). Nevertheless, we observed an increasing number of aggressive interactions over the past 10 years (Martinez and Cobo 1993). These encounters have mainly been brief and have amounted to nothing more than attempts to steal nest material and food delivered to nestling. Our observation of actual fighting between two female Griffon Vultures was unusual but it may indicate that as the density of the nesting population of Griffon Vultures continues to increase in the Riaza River gorge, aggression within this species will become more violent.

RESUMEN.—Se describe un caso de agresión violenta de un buitre negro (*Aegypius monachus*) adulto a un juvenil de buitre leonado (*Gyps fulvus*) en una carroña de vaca que congregó un número inusual de individuos de la primera especie. El buitre leonado pudo haber muerto como consecuencia de la gravedad de la herida producida en el cuello por el buitre negro. Se documenta también la observación de una pelea muy violenta entre dos hembras de buitre leonado en un lugar de nidificación ocupado por una de ellas y su pareja, lo cual se interpreta como resultado de una fuerte competencia por el lugar de nidificación en una colonia de muy alta densidad poblacional en España.

[Traducción de los Autores]

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HUNTING SYNCHRONY IN WHITE-TAILED KITES

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Hunting behavior of White-tailed Kites (*Elanus leucurus*) has been extensively studied (Bammann 1975, Warner and Rudd 1975, Mendelsohn and Jaksic 1989). Kites primarily use open to semi-open habitats for hunting (Waian 1973, Bammann 1975, Dunk and Cooper 1994). In California, kites almost exclusively hover while they hunt (Mendelsohn and Jaksic 1989, Dunk 1995) and prey on small mammals, primarily voles (*Microtus* spp.) (Hawbecker 1940, 1942, Stendell 1972).

In previous studies of kites, we observed that groups of kites (2–20 individuals) appeared to hunt relatively synchronously and the probability of an individual kite hunting appeared to be related to whether other kites were hunting. Hunting synchrony could result from kites advertising their presence to conspecific territory holders to potentially decrease subsequent interactions, or to more easily patrol and defend a territory, or from kites responding to variability in prey availability as a function of prey activity rhythms. Shields (1976, cited in Madison 1985) found California voles (*M. californicus*) exhibited ultradian rhythms in activity varying from 2–6 hr. Daan et al. (1982) reported positive correlations between vole activity and timing of hunting by raptors in Europe. We examined whether kites hunted independent of other individuals hunting.

STUDY AREA AND METHODS

This study was conducted at the Mad River Slough Wildlife Area, Arcata, California. The area consists of approximately 185 ha of ungrazed grassland with little topographic relief. It contains very few trees and shrubs, and fence posts and T-bars (ca. 3-m tall) provide most of the perches for raptors. The climate is maritime with mild winters and cool summers.

The study took place from 20 November 1994–30 January 1995. We made observations during seven 1–2 hr periods. Random points within the study area were established from which observations were made. Scan sampling (Altmann 1974) was used to record number of kites hunting. Using a landmark on the horizon as a starting point, we slowly scanned ($\bar{x}$ time per scan = 90 sec, range = 45–135 sec) 360° and recorded the number of kites hunting (hovering). Scans were made using binoculars. All kites were within approximately 400 m of the observer. We waited 5 min between scans based on Bammann's (1975) findings that mean hunting time for kites was 5.04 min (N = 674 hunts) in this area.

To determine whether kites hunted independent of other hunting kites, we compared observed numbers of kites hunting during each scan to expected numbers under the Poisson distribution using Chi-square analysis. We used this analysis because comparison of observed events